

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A method for measuring an unfilled [[a]] patterned structure (3), the pattern comprising features each having a width dimension, the method comprising:
exciting irradiating the unfilled patterned structure (3) by irradiating it with a spatially periodic laser intensity pattern in order to generate excite surface acoustic waves having a wavelength larger than the feature width dimensions;
diffracting a probe laser beam (6) off the thermal grating generated surface acoustic waves to form a signal beam;
detecting the signal beam as a function of time to generate a signal waveform; [[and]] determining a surface acoustic wave phase velocity from the signal waveform; and
determining at least one property of the patterned structure based on the effect of the surface profile of the unfilled patterned structure on the surface acoustic wave phase velocity.
2. (Original) The method of Claim 1, wherein the exciting step further comprises a spatially periodic laser intensity pattern having a period ranging from 1 to 20 microns.
3. (Currently Amended) The method of Claim [[1]] 17, wherein the unfilled patterned structure ~~is comprised of~~ comprises trenches equal to or less than approximately 2 μm in width.
4. (Currently Amended) The method of Claim 3, wherein the unfilled patterned structure further comprises a periodic array of trenches.
5. (Currently Amended) The method of Claim 4, wherein the unfilled patterned structure further comprises a periodic array of linear trenches.

6. (Currently Amended) The method of Claim 4, wherein the unfilled patterned structure further comprises a two-dimensional periodic array of trenches.
7. (Original) The method of Claim 4, wherein the trenches are fabricated in a silicon substrate.
8. (Original) The method of Claim 3, wherein the trenches are fabricated in a thin film.
9. (Currently Amended) The method of Claim [[1]]17, wherein the at least one property comprises trench depth.
10. (Currently Amended) The method of Claim [[1]]17, wherein the at least one property comprises trench width.
11. (Original) The method of Claim 1, wherein the at least one property comprises a depth profile of the trench structure.
12. (Currently Amended) The method of Claim 1, wherein the determining step further comprises combining measurements at multiple acoustic wavelengths to determine multiple parameters of the trench unfilled patterned structure.
13. (Original) The method of Claim 5, wherein the determining step further comprises combining measurements along and across the trench structure to determine both trench depth and width.
14. (Currently Amended) The method of Claim 1, wherein the determining step further comprises combining measurements within and outside the unfilled patterned area to separate the effect on the surface acoustic wave velocity caused by the trench structure surface profile from other effects such as film thickness.

15. (Currently Amended) The method of claim 1, wherein the determining step ~~comprises analysis of the signal waveform with~~ employs a theoretical model based on effective elastic properties of the structure.

16. (Currently Amended) The method of Claim 1, wherein the determining step ~~comprises analysis of the signal waveform with~~ employs a model based on an empirical calibration.

17. (New) The method of Claim 1, wherein the unfilled patterned structure comprises a plurality of unfilled trenches.